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| 09/746,744 | 12/22/2000 | Steven A. Rogers | CETA-001XX | 6878 |
| 207 | 7590 | 01/13/2006 | EXAMINER | |
| WEINGARTEN, SCHURGIN, GAGNEBIN & LEOVICI LLP | | | SCHEIBEL, ROBERT C | |
| TEN POST OFFICE SQUARE | | | ART UNIT | |
| BOSTON, MA 02109 | | | PAPER NUMBER | |
| | | | 2666 | |

DATE MAILED: 01/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|---------------------------------------|------------------------------------------|--|
| Office Action Summary | Application No. 09/746,744 | Applicant(s) ROGERS, STEVEN A. | |
| | Examiner Robert C. Scheibel | Art Unit 2666 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-44 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2-25-02 & 8-14-03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

- Applicant's Amendment and Request for Continued Examination (RCE) filed on 10/20/2005 is acknowledged.
- Claims 1-3, 7-8, 12-14, 16, 18-19, 23-26, and 28-29 are currently amended.
- Claims 31-44 are newly added.
- Claims 1-44 are currently pending

Response to Arguments

1. Applicant's arguments, see pages 13-14, filed 10/20/2005, with respect to the rejection of claims 1-10, 12-21, and 25-30 under 35 U.S.C. 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of U.S. Patent 6,611,519 to Howe.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims **1-44** are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,611,519 to Howe, et al.

Regarding claim 1, Howe discloses a method for switching data packet flows with guaranteed delay and bandwidth comprising: receiving expected packet arrival time information at a switch (see lines 20-24 of column 6, lines 3-13 of column 10 and Figure 42; the packet arrival time is included in the call setup message – see the desired start time field), wherein said expected packet arrival time information is associated with a packet flow (the packet arrival time is clearly associated with the packet flow in the call setup message where it is included along with flow identification information such as the source and destination addresses), and wherein said expected packet arrival time information indicates an expected packet arrival time at which at least one packet associated with said packet flow is expected to be received by said switch (the desired start time is the time at which the first packet is intended to be received at the first switch (router));

receiving forwarding information associated with said packet flow, wherein said forwarding information indicates how said switch should forward a packet that arrives at said expected packet arrival time, and associating said forwarding information with said expected packet arrival time (the destination address included in the call setup message clearly is forwarding information that indicates how these packets should be forwarded; it is clear that the packet arrival time is associated with this information by virtue of being in the same setup message and the fact that the start times and address information are used to setup a path through the network; see also lines 29-42 of column 4);

pre-establishing a path through said switch for a predetermined period of time that includes said expected packet arrival time (see lines 29-42 of column 4 and lines 20-37 of column 6, for example; see also figure 35);

Art Unit: 2666

receiving a packet at said expected packet arrival time (see lines 38-42 of column 4 and lines 33-37 of column 6 which indicate that a packet is sent through the network on the pre-established path, clearly indicating that the packet is received at each network element in the path); and

forwarding, via said pre-established path through said switch, said packet based on said forwarding information associated with said packet arrival time (see lines 38-42 of column 4).

Howe similarly discloses the very similar limitations of claims **12 and 39**. The slight change in claim 39 whereby the path is established for a predetermined amount of time is disclosed in the expected duration of session field in Figure 42.

Regarding claims **25 and 28**, Howe discloses a schedule based packet switch, comprising: a master clock system, said master clock system operative to determine a beginning of a schedule interval (the master clock system is the GPS receiver in the switch (router); see lines 1-10 of column 5 and lines 7-16 of column 6);

schedule information defining at least one packet flow schedule (see lines 7-16 of column 6), wherein said schedule information defines scheduled reception and transmission times for at least one packet associated with said at least one packet flow (see lines 13-16 of column 6), wherein the scheduled reception time indicates an expected packet arrival time at which said at least one packet associated with said at least one packet flow is expected to be received by said switch (see figure 35 and figure 37); and

a plurality of interface ports, each of said interface ports having transmit control logic and receive control logic, wherein each of said transmit and receive logic is responsive to said schedule information and said master clock system (clearly, there is logic controlling the receive

Art Unit: 2666

and transmit ports of the router; this is the means by which the packets are passed through the network as described in lines 25-37 of column 6, for example), wherein said transmit control logic of at least one of said plurality of interface ports is operable to determine a transmit time of a received packet associated with said at least one packet flow in response to a transmit time offset into said schedule interval defined by said packet flow schedule (this limitation is also disclosed in lines 20-27 of column 6; the offset into the interval is the specific time discussed in this passage which comprises the packet flow schedule).

Regarding claims **2, 13, and 40**, Howe discloses the limitation of receiving packet transmission time information at the switch, wherein said packet transmission time information is associated with said packet flow and indicates a time at which the switch may transmit the packet in the call setup message. The transmission time information is the desired start time (see figure 42) and the acceptable delay (see mode 3 box in figure 36 which indicates that this is included in the call setup message). These two times bound the acceptable transmission time for the packet. The limitation that the packet is transmitted at said packet time is disclosed throughout the reference (see lines 25-32 of column 6, for example).

Regarding claims **3 and 14**, the limitation of associating said expected packet arrival time information with a first port, wherein said receiving of said packet is at said first port is disclosed in the table of figure 37. In this case, the time column is the expected arrival time and the input column associates this time with a particular input port.

Regarding claims **4 and 15**, the limitation of associating said packet transmission time information with a second port of said switch and said transmitting of said packet is at said second port it also disclosed in the table in figure 37. In this case, the packet is either transmitted

Art Unit: 2666

immediately, or after a delay to account for the time offset with the next node. In either case, this time is indicated in this table and the output column associates it with a particular output port.

Regarding claims **5 and 16**, Howe discloses the limitation that the packet flow is associated with a real-time application throughout, see lines 5-12 of the abstract or lines 17-37 of column 6, for example. Howe discloses the limitation of receiving another packet associated with a non-real-time application as well as delaying the transmission of non-real-time traffic to transmit said real-time traffic in lines 28-52 of column 4.

Regarding claims **6 and 17**, Howe discloses the limitation that receiving said packet associated with the non-real-time application occurs prior to the receiving of the real-time packet. The non-real-time packets are buffered and then forwarded (described as standard store-and-forward throughout) and the real-time packets bypass this process; thus non-real-time packets can be in the queue when a real-time packet arrives and bypasses this packet. See lines 49-67 of column 28 for example.

Regarding claims **7 and 18**, Howe discloses the limitation of receiving a reference packet at a reference time (the master pulse in figure 41); the limitation of determining a schedule interval start time in response to said reference time (the nodes use their master clocks to synchronize the sending of real-time packets as described throughout and thus use the (master pulse) reference time to determine a start time); and the limitation of determining said expected packet arrival time based on the interval start time and the expected packet arrival time (the expected start time can be delayed anywhere from the desired start time to the desired start time

Art Unit: 2666

plus the acceptable delay (see mode 3 box in figure 36 which indicates that this is included in the call setup message)).

Regarding claims **8 and 19**, Howe discloses the limitation that the expected packet arrival time information includes an offset value and that the determining of the arrival time includes adding the offset value to the interval start time; the offset is the periodic interval field of the call setup message in figure 42. This interval (or a multiple thereof) is added to the start time to determine future arrival times, thus disclosing the limitations of claims 8 and 19.

Regarding claims **9 and 20**, Howe discloses the limitation of receiving a reference packet at a reference time (the master pulse in figure 41); the limitation of determining a schedule interval start time in response to said reference time (the nodes use their master clocks to synchronize the sending of real-time packets as described throughout and thus use the (master pulse) reference time to determine a start time); and the limitation of determining said expected packet arrival time based on the interval start time and the expected packet arrival time (the expected start time can be delayed anywhere from the desired start time to the desired start time plus the acceptable delay (see mode 3 box in figure 36 which indicates that this is included in the call setup message)).

Regarding claims **10 and 21**, Howe discloses the limitation that the expected packet arrival time information includes an offset value and that the determining of the arrival time includes adding the offset value to the interval start time; the offset is the periodic interval field of the call setup message in figure 42. This interval (or a multiple thereof) is added to the start time to determine future arrival times, thus disclosing the limitations of claims 10 and 21.

Regarding claims **11 and 22**, Howe discloses the limitation of transmitting said packet transmission time information to a second switch and receiving an acknowledgement indicating approval or disapproval in figure 43 which shows the call setup sent from one node (originating edge node) to a second node (middle node) and also shows a corresponding response which indicates that the request is accepted or rejected (bottom of left-hand column).

Regarding claim **23**, Howe discloses the limitation of a first subset of originating packet switching devices in the originating edge nodes and a second subset of receiving packet switching devices in the terminating edge nodes (see figure 43 for example).

Regarding claim **24 and 38**, Howe discloses the limitation that a predetermined one of the plurality of packet switching devices serves as a centralized scheduling agent by originating reference packets (call setup messages) in the originating edge node of figure 43.

Regarding claims **26 and 29**, Howe discloses the limitation of determining the expected reception time in response to an offset value; the offset is the periodic interval field of the call setup message in figure 42. This interval (or a multiple thereof) is added to the start time to determine future arrival times, thus disclosing the limitations of claims 26 and 29.

Regarding claims **27 and 30**, Howe discloses the limitation that the master clock system is responsive to an external clock reference (the master clock GPS system of Figure 2, for example), wherein the external clock reference is based on a received heartbeat packet (the master pulse in figure 41).

Regarding claims **31 and 41**, Howe discloses the limitation that said pre-establishing said path through said switch comprises establishing said path from a first port to a second port according to said forwarding information in figure 37 which indicates input and output ports

Art Unit: 2666

(first and second ports) from and to which the real-time packets associated with the flow are to be transmitted at the scheduled time.

Regarding claim **32**, Howe discloses the limitation of disestablishing said path after a predetermined time in step 7 from lines 29-39 of column 11.

Regarding claim **33 and 42**, Howe discloses the limitation of periodically re-establishing said path in lines 38-40 of column 11. The limitation of forwarding received packets on a first port to said second port according to the forwarding information is disclosed throughout (see lines 28-42 of column 4, for example). This is also disclosed in a different way in the periodic scheduling time discussed in lines 20-37 of column 6.

Regarding claim **34, 35, and 43**, Howe discloses the limitation that said expected packet arrival time information indicates a repeat time interval between packets in lines 20-24 of column 6 as well as the periodic interval field of figure 42 (the call setup message). The limitation of periodically re-establishing said path according to said repeat time interval is disclosed in lines 20-37 of column 6 where it is clear that the path is re-established at repeating intervals in order to properly switch the real-time packets. The further limitation of claim 35 of receiving subsequent packets at times corresponding to said expected packet arrival time and said repeat time interval is also clear in lines 20-37 of column 6. The further limitation of claim 35 of forwarding received packets according to the forwarding information is disclosed throughout (see lines 28-42 of column 4, for example).

Regarding claims **36 and 44**, Howe discloses the limitation that the packets are forwarded without referencing destination information within said packet throughout. Howe refers to this real-time schedule based switching as “layer one switching” because the switch

Art Unit: 2666

does not look into the upper layers and thus does not reference destination information within the packet (contained in the higher layers 2 or 3). See lines 7-16 of column 6 for example.

Regarding claim 37, Howe discloses the limitation that the control logic for pre-establishing a path through the switch comprises a crosspoint matrix coupled to the control logic for receiving the packet and the control logic for forwarding the packet and operable to establish the path according to the forwarding information in the non-blocking, non-delaying switch 150 of figure 9.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The article "Packet Sequencing: A Deterministic Protocol for QoS in IP Networks" to Moore et al discloses many of the features of the present invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert C. Scheibel whose telephone number is 571-272-3169. The examiner can normally be reached on Monday and Thursday from 6:30-5:00 Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema S. Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2666

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RC 12-29-95

Robert C. Scheibel
Examiner
Art Unit 2666

Ton Martin

DANG TON
PRIMARY EXAMINER